BI Accelerator: Case Study of Retail Industry
NYOUG Annual Day 2008

Forrest Snowden and Shyam Varan Nath
Deloitte Consulting LLP
September 10, 2008
<table>
<thead>
<tr>
<th>Agenda for Today</th>
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<tbody>
<tr>
<td>Forrest Snowden (Overview of RBIA)</td>
</tr>
<tr>
<td>Shyam Varan Nath (Technical Details of RBIA)</td>
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</tbody>
</table>
Trends in the Retail Sector

- We are beginning to see emergence of the next generation of retail analytic solutions for areas such as merchandising, pricing, …

- We are on the cusp of a wave of Multi-channel retail transformation efforts

- Transformation will be big, intrusive and invasive to the current operations of large retailers

- On-Line retailers may begin to recognize the benefit of select physical locations
Key Business Issues

Key issues:

- How should retailers improve pricing, promotion and merchandising practices with the help of technology?
- How can retailers leverage business intelligence and analytics to grow their businesses?
- Remain competitive

Answers: Retail BI Accelerators

- Leverage pre-built software known as an accelerator
- As an example, harness the power of a market ready retail BI Accelerator that’s integrates with your DB and BI tools
The Value of Retail Accelerators

- **Rapid ROI.** With its low cost of entry, fast implementation, measurable impact on costs and productivity

- **Pre-built.** Start with pre-built BI reports and dashboards incorporating the industry leading practices on top of Industry Standard Reference Data model (ARTS)

- **Oracle Products.** Oracle components like OWB, Oracle Data Warehouse, OLAP, Data Mining and OBIEE in combination with Retail Industry
Association for Retail technology Standards provides ARTS - the standard based data model for retail industry
- Not restricted to DW alone. Can be used for SOA, ODS or other data integration effort
- Relevant (up-to-date) for retailers needs
- Repository driven

ARTS data model applies to different segments of retail industry
The ARTS Retail Data Model currently supports following business areas

– Merchandise flow management
– Inventory management
– Item and price maintenance
– Point of sale processing
– Tender control
– Store administration
– Customer relationship management
– Sales and productivity reporting
– Ordering (partially supported)
– Workforce Management (partially supported)
Retail Store Level - Store Operation

- **Customer Relationship Management** – The identification of the customer and their preferences, with the provision of gift registry loyalty awards schemes etc.
- **Receiving & Ticketing** – The receiving of goods from distribution centers and suppliers and the booking it into in-store inventory. The newly received stock is priced and labeled as required.
- **Breakdown Bulk into Retail Items** – Separation of bulk items (e.g. cartons) into single units rendering them ready for sale.
- **Merchandise display, pricing & sales** – The display of store merchandise on shelves, together with their allocated prices and the tracking of the sales to customers.
- **Collect Tender** – The electronic authorization of checks, credit & debit cards, as well as the validation of gift certificates and loyalty award points in payment of goods being sold.
- **Manage workforce** – The scheduling of staff as well as the monitoring of their performance.
- **Track & report store operation performance** – The tracking and reporting of various financial and operational performances for each individual store.
The Product Includes:

- **Industry Specific DW**
  - DW Data Model
    - Industry Standard (ARTS) Compliant
    - 3rd Normal Form -LDM, PDM
    - Dimensional (STAR & OLAP)

- **Oracle Tech Stack**
  - Database 10GR2 EE With Options: Partitions, OLAP, Data Mining
  - Oracle Designer
  - OBI EE

- **Industry Specific DW Content**
  - Pre-built DW with 650+ Tables and 10500+ attributes
  - Pre-built OLAP Cubes (15+)
  - Pre-built Data Mining Models (10+)
  - Pre-built Reports (320+) with Role based Dashboards
  - Intra ETL using OWB
  - Leveraging 10gR2 DW features including Statistics & Advanced SQL

- **Database EE 10g.R2 Platform**
  - Role-Based Dashboard
  - Retail BI Warehouse Data Model
    - OLAP
    - Data Mining
    - Partitioning
    - RAC
    - Spatial
Technology Layers

- Layered BIDW stack to use the advanced analytics
Why Multiple Analytics Tools?

- Solving different analytics problems using each tool

Support for Query/Reporting, OLAP, and Data Mining

ODWR provides the infrastructure to rapidly set up a business intelligence solution involving query and reporting, OLAP, and data mining.

<table>
<thead>
<tr>
<th>Query and Reporting</th>
<th>OLAP</th>
<th>Data Mining</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraction of detailed and summary data</td>
<td>Summaries, trends, and forecasts</td>
<td>Knowledge discovery of hidden patterns and insights</td>
</tr>
<tr>
<td>&quot;Information&quot;</td>
<td>&quot;Analysis&quot;</td>
<td>&quot;Insight and Prediction&quot;</td>
</tr>
<tr>
<td>Who purchased insulin pumps in the last 3 years?</td>
<td>What is the average income of insulin pump buyers by region by year?</td>
<td>Who will buy an insulin pump in the next 6 months and why?</td>
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Value v/s Generation Steps in Analytics

Intelligent Interactions (Data Mining)
- Is the product assortment optimal for all my regions?

Fact-Based Actions (OLAP, Statistics)
- What are my potential out-of-stock situations?

Performance Management (KPI, Guided Analytics)
- How is the business doing compared to last year? Compared to plan?

Slice/Dice, Ad-hoc, Query, BI Tools
- What is my gross margin return on space?

Transactional Reporting
- How are my catalog and internet sales performing?

Generation Steps
1. Reporting
2. Analysis
3. Forecasting
4. Predictive
5. Value
Reference Data Model in RBIA

- Items & SKU's
  - Service, Prepared, Construction, Collection
  - Inventory, Pricing, Shelf Rule
  - Selling, Deposit, Spiff, Restriction Rule
  - Vendor Item, Flavor, Variety, Manufacturer, Syndicated data, POS Identity
  - Flexible Hierarchy

- Organization
  - Store, Warehouse, DC, e-Commerce
  - Market Areas, Trading Areas, Touch points
  - Inventory Location, Selling Location
  - Syndicated Data
  - Flexible Hierarchy

- Vendor
  - Appointment, Contract
  - Factor, Rating, Deal, Discrepancy Rule
  - Vendor Item, Assignment to Business Unit

- Location / Geography
  - Syndicated Data
  - Flexible Hierarchy
  - Related Address

- Employee
  - Flexible Roles, Schedules & Tasks
  - Splits, Commissions & Spiffs

- Customer
  - Affiliation
  - Prospect
  - B2B & B2C
  - Syndicated Data

- Time
  - Time
  - Types of Calendar, Transformation
  - Flexible
Aggregate Data Model (Dimensional for OLAP)

- **Retail Sale, Return, Tender, Markdown, Till**
  - Day/Week @
  - Item/Subclass/Dept
  - Employee/Touch Points
  - Override, Discount
  - Time Series
  - Flow Analysis
  - POS, Tender

- **Inventory Position**
  - Day/Week @, Item/Subclass/Dept
  - Out-of-stock, Zero Selling
  - Forecast
  - Time Series

- **Merchandising Category**
  - Scorecard
  - Items, Employee, Customer, Frequent Shopper
  - What-if
  - Forecast & Time Series

- **Actual vs. Plan**
  - Forecast & Time Series
  - Merchandise & Category
  - Stores Sales Plan
  - Promotions

- **Customer Order**
  - Day/Week @ Item / Subclass / Dept
  - Employee / Touch Points

- **Events & Promotions**
  - Actual vs. Plan vs. Updated Plan
  - Contribution:
    - Campaign, Media
    - Message, Rendering
  - Forecast & Time Series
  - RFMP, Migration
**Derived Data Model (Data Mining)**

<table>
<thead>
<tr>
<th>Retail Sale, Return, Tender, Markdown, Till</th>
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<td>✓ Day/Week @</td>
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Data Warehouse Features of Oracle

- RBIA uses the features of Oracle Database that help to optimize Data Warehouses:
  - Partitioning (exchange partition for loading data)
  - Compression
  - Materialized views for SQL re-write
  - External Tables
  - Bit mapped indexes
  - Statistical Package, Ranking, Lag/Lead
Pre-built Advanced Analytics

**Mining Model**

- **Clustering Algorithm**
  - Item basket
  - Associate basket
  - Customer bundle
  - Frequent shopper
  - Customer bundle

- **Classification / ABN**
  - Store loss
  - Associate loss
  - Item POS loss
  - Associate Sales

- **Decision Tree**
  - Price Elasticity
  - Customer Price
  - Elasticity

**OLAP Model**

- **Times Series**
  - POS Flow Analysis
  - In-store Sales
  - Tender & Till

- **Forecasting**
  - Out-of-Stock
  - Store Compensation
  - Promotion Analysis
  - Cost & Contribution
  - Sales & Margin

- **What If**
  - Loss prevention
  - Transaction Analysis
  - Shrink Analysis
  - Customer Analysis
  - Frequent Shopper
  - Customer RFM
<table>
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<tr>
<th>Ten Business Areas</th>
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<tr>
<td>Store Operations</td>
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<tr>
<td>Point-of-Sale (POS)</td>
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<tr>
<td>Loss Prevention</td>
</tr>
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<td>Merchandising</td>
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<td>Inventory</td>
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<tr>
<td>Workforce Management</td>
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</tr>
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<td>Promotion</td>
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Retail Business Area

Business Areas

- Store Operations
- Point of Sale (POS)
- Loss Prevention
- Merchandising
- Inventory
- Workforce Mgmt.
- Order Mgmt.
- Customer
- Category Mgmt.
- Promotion

Base Layer
Derived Layer
Aggregate Layer

Merchandising
Purchasing
Distribution
Sales
Finance
Marketing

One Common Knowledge Base for Improved Analysis & Decision Making
Business Areas (1/5)

Store Operations

- Store Performance
  - Sales & Margin
  - Department & Item
  - Shopper Conversion

- Location Scorecard
  - Sales & Inventory locations
  - POS Department

- Employee Compensation
  - Commissions & Spiffs
  - Splits

Point-of-Sale (POS)

- Channel Transaction Analysis
  - Measures / Time
  - Visits / Sales

- Transaction level data (NOT summarized only)

- POS Flow:
  - Transactions, Items Value

- Transaction Value
  - Associate
  - Tender

- Time of Day
  - Store
  - Associate
Business Areas (2/5)

Loss Prevention

- Over / Short
  - Store & Shift
  - Cashier & Register
- Returns, Overrides, & Discounts
  - Store
  - Associate
  - Customer
- Prescriptive Analytic
  - Employee & Customer ("sweetheart")
  - Associate & Store
  - Shift, Register
  - Tender

Merchandising

- Traditional Merchandising “bible”
  - Comp Sales Store and Department
- Movement Analysis
  - Fast moving
  - Slow moving
- Scorecards:
  - Inventory – Sales, Turns, & Margin
  - Markdown – Clearance and Promotional
  - GMROS & GMROI
Inventory

- Sales Anomalies
  - Out-of-Stock
  - Zero Selling Occurrences
- Scorecards
  - Supplier
  - Product
- Shrinkage Patterns
  - Item
  - Associate

Workforce Management

- Workforce
  - Schedule: Plan vs. Actual
  - Performance: Cashier, Sales Associate
  - Sales Measures: AUS, AVS, UPT
- Employee
  - Roles vs. Reported
  - Flexibility
- Prescriptive Analytic
  - Employee Deployment Rules
Business Areas (4/5)

Order Management

- Customer Order Tracking
  - Fulfillment
  - Cancellations
  - Backorders
- Fulfillment Performance
  - Orders
  - Customers
  - Aging
- Channel Volume
  - Call Center
  - Internet

Customer

- Customer Segmentation
  - Segment Formation
  - Segment Migration
  - RFMP Analysis
- Basket Analysis (Product Mix)
  - Frequent Shopper
  - Anonymous Customer
  - Profitability
- Customer Profile Trends
  - Transition
  - B2B & B2C
  - List Performance
Business Areas (5/5)

**Category Management**
- Performance
  - Top/Bottom Sales
  - Product Cluster
  - Contribution
- Competitor
  - Item
  - Syndicated Data
- What If
  - Item price elasticity
  - Clustering

**Promotion**
- Performance – sales and margin
  - Plan vs. actual
  - Lift
- Promotion Comparison
  - Campaign & Media
  - Communication & Media
  - Channel
- Contribution by Event
  - Time Series
  - Causal
  - Halo
Out-of-Box Data Model Cater to These

Profile Trends
- Transition
- B2B & B2C
- List Performance

Prescriptive Analytic
- Employee & Customer ("sweetheart")
- Associate & Store, Tender Shift, Register

Contribution by Event
- Time Series
- Causal
- Halo

Shrinkage Patterns
- Item
- Associate

Channel Transaction Analysis
- Measures / Time
- Visit / Sales

Employee Compensation
- Commissions & Spiffs
- Splits

Scorecards
- Inventory Turns
- Markdown Clearance
- GMROS & GMROI

What-if
- Item Price Elasticity
- Clustering

Customer Order Tracking
- Fulfillment
- Cancellations
- Backorders
Screenshots and Demos

WALLY IN MARKETING

WALLY, I WANT YOU TO DESIGN OUR SALES COLLATERAL.

THE TRICK IS TO COMPARE OUR PRODUCT WITH THINGS THAT ARE EVEN WORSE.

“PRETTIER THAN A SKUNK SANDWICH AND COOLER THAN A HOBO’S MITTENS.”

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RBIA - OBIEE Screens
Questions

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